telephone call was to propose a discussion of U.S. Patent No. 4,958,649 (Pethö), which serves as the primarily basis for the rejections of claims formulated in the Office Action, in person at the U.S. Patent Office. The Examiner declined the interview, and instead requested a written submission of the presentation which was to have been made at the proposed interview. The present Reply is being filed in furtherance of the Examiner's request.

Turning now to the merits of the Office Action mailed June 28, 2005, pending claims 30 to 39, 41 to 53, 55 to 58 and 60 have been rejected under 35 U.S.C. §102(b) as being anticipated by the previously mentioned U.S. patent to Pethö (US 4,958,649). Claims 59, 61 and 62 have been rejected under 35 U.S.C. §103(a) as being unpatentable over the cited patent to Pethö, and claims 40 and 54 have been rejected under 35 U.S.C. §103(a) as being unpatentable over a proposed combination of the cited patent to Pethö and a U.S. Patent to Zucchini et al. (US 5,098,447).

The undersigned notes with appreciation the Examiner's extensive analysis of how the patent to Pethö is being applied to applicant's claims. It is submitted, however, that a detailed review of the manner of operation of Pethö's apparatus will show that there are significant and patentable differences between the disclosed apparatus and the apparatus recited in applicant's pending claims 30 to 62.

Pethö describes an apparatus that generally takes the form of a cylindrical chamber (col. 4, line 10) containing a

plate pack which is capable of rotating around a central shaft 25 located within the chamber (col. 4, line 43). The plate pack is comprised of a plurality of plates 13 which combine to develop a plurality of channels 16, each of which can contain a quantity of stoppers 14 (col. 4, lines 20 to 22) for purposes of treating the stoppers as will be discussed more fully below.

It is important to note that neither the term "spiral" nor the term "helical" is used in Pethö's disclosure relative to the channels 16, or otherwise. Instead, noting line 26 of column 4, and elsewhere, it is indicated that the channels 16 proceed "along evolvent lines". With reference to Webster's Unabridged Dictionary, Second Edition (1975), the term "evolvent" is defined as "an involute", which is defined as a "curve traced by the end of a taught string when it is wound upon or unwound from a fixed curve on the same plane with it". Copies of these dictionary definitions are enclosed with this Reply. Thus, the channels 16 of Pethö are fairly characterized as being curved in nature, but are not said to be either spiral or helical in nature. Also, noting lines 23 to 27 of column 5 of Pethö, the purpose of the evolvent channels 16 is:

> to place a maximum number of stoppers on each of the plates, so as to utilize the area of each plate optimally... [, which] enables a very large number of stoppers to be accommodated in one plate pack of moderate dimensions.

There is no disclosure that the evolvent channels 16 are used to develop a helical transport path, in accordance with applicant's claims, or otherwise.

The significant differences between the apparatus disclosed by Pethö and the apparatus recited in applicant's claims are further apparent when considering how the foregoing structures operate on a quantity of the stoppers 14, which is discussed beginning at line 43 of column 7.

> The apparatus is completely empty of stoppers in its starting mode, and the plate pack 13 is located in its right-hand terminal position along the shaft 25, as illustrated in FIG. 2. A channel 16 on the plate of said plate pack located nearest the left-hand side is positioned opposite the stopper inlet opening 8. At this stage, all barrier rods 56 occupy a position in which they close the channels 16 in the plate 13 located opposite the inlet opening 8.

Thus, the plate pack is initially positioned to the right of the apparatus, as shown in the drawings, with a left-most channel positioned to receive stoppers 14.

A barrier rod 56 associated with a first channel 16 to be filled is then retracted (col. 7, lines 53 to 65) and stoppers received through an inlet opening 8 positioned at the top of the chamber are then introduced into the channel 16 (col. 7, lines 66 and 67) under the influence of gravity (col. 6, lines 25 to 28).

After the channel 16 has been filled the barrier rod 56 is returned to a position which closes off the channel 16, to contain the quantity of stoppers 14 received by that channel (col. 8, lines 8 to 21), and "the plate pack is rotated through one step, such that a following channel 16 will be located opposite the article inlet opening 8" (col. 8, lines 25 to 28).

This process is then repeated, responsive to indexed rotations of the plate pack, filling subsequent channels 16 with

stoppers 14, and in turn "filling all channels or compartments 16 on one plate with stoppers" (col. 8, lines 40 to 68). To be noted is that during this process:

> [r]otation of the plate pack is controlled by means of the dogging elements 41, the respective recesses 42 of which are in engagement with a rib 40 extending peripherally around the inside of the chamber wall. This will prevent the plate pack from being moved axially, while still enabling the plate pack to be freely rotated (col. 8, lines 61 to 66).

Thus, during the filling of the channels of a given plate, only rotation of the plate pack is permitted. Axial movement of the plate pack is prevented.

Following this, "the plate pack [is] moved rearwardly in an axial direction to an extent corresponding to the distance between two mutually adjacent plates in the plate pack" (col. 9, lines 13 to 16), "and... the pack [is fixated] in a new axial position, in which the plate pack can still be freely rotated" (col. 9, lines 20 to 22). The process then continues, filling channels 16 with stoppers 14 received from the inlet opening 8. Accordingly, the channels associated with additional plates are filled responsive to axial movements of the plate pack "in a rearward direction, subsequent to rotating the plate pack through one complete revolution" (col. 9, lines 31 to 33).

For purposes of guiding such movements (referring to col. 5, lines 32 to 51), a series of dogging elements 41 are provided which cooperate with a series of peripheral ribs 40 placed perpendicular to the shaft 25 so that during loading of the stoppers:

> the recesses of the dogging elements are in engagement with a rib, [and] the plate pack will be stationarily held in the axial direction while being freely rotatable, the dogging element recesses sliding along the ribs during rotation of the plate pack.

From this it is seen that while the plate pack can either rotate in plane, or move axially along the shaft 25, the combined axial movement and rotation of the plate pack which would be required to develop a helical transport path is specifically precluded by interaction between the dogging elements 41 and the peripheral ribs 40. Accordingly, Pethö does not disclose a helical path for directing stoppering parts through a sterilizing machine, as is specifically recited in applicant's claims.

Referring next to lines 54 to 57 of column 9 of Pethö:

> [w]ashing and sterilizing of the stoppers can be commenced, subsequent to filling all of the channels 16 in the plate pack with stoppers, or subsequent to filling a desired number of said channels.

This is accomplished responsive to an injection of suitable fluids into a series of connections 10, 11, 12, in conjunction with rotations of the plate pack (line 66 of column 9 to line 25 of column 10).

> Because the channels of the inventive apparatus are configured as evolvent lines, during rotation of the plate pack each stopper will move in a manner to be separated from mutually adjacent stoppers twice with each full revolution. In this respect, the degree of movement can be varied, for instance, by varying the number of stoppers introduced into each channel. This movement of the stoppers means that the total surface area of the stoppers will be exposed to the washing and sterilizing media, therewith enhancing the effect of the treatment. The stoppers are also prevented, at the same time,

> from adhering to one another and therewith being deformed or having pieces or particles removed therefrom as a result of mutual contact. This represents an important advantage afforded by the invention. (col. 10, line 26 to 40)

From this, two important distinctions become apparent. First, the specific configuration of the apparatus, including the manner in which the plate pack is operated during sterilization and the specific configuration selected for the channels 16, contributes to effective treatment using the apparatus. Second, rotation of the plate pack is used not only to load and unload the stoppers (as will be more fully discussed below) but also to effectively expose the stoppers to the washing and sterilizing media. It is further stated that this "represents an important advantage afforded by [Pethö]".

Accordingly, the step-wise discontinuous loading used by Pethö, in conjunction with rotations of the plate pack during the sterilization process, were considered to be important to the invention which is disclosed by Pethö, and are distinguished by applicant's helical path for directing stoppering parts through a sterilizing machine, as is specifically recited in applicant's claims. Such operations are further distinguished by the use of a driving fluid to move stoppering parts through a sterilizing apparatus, as distinguished from the rotational movements used by Pethö, and as is specifically recited in applicant's dependent claim 47.

To be noted is that:

> [w]hen the sterilizing process has been completed and the stoppers are to be removed from the

> apparatus, the plate pack will be located in its furthest withdrawn position, nearest the drive wheel 27, as illustrated in FIG. 3. At the same time, the leading plate 13 located furthest to the right of the plate pack, together with the channels or compartments 16 on said plate (FIG. 2) will be located opposite the stopper outlet opening 9. (col. 10, lines 50 to 57)

Thus, the plate pack will at this point in the process be positioned fully to the left of the apparatus, as shown in the drawings, and the right-most plate 13 of the plate pack will be positioned adjacent to the stopper discharge outlet 9. The plate pack is then "moved rearwardly to an extent corresponding to the distance between two mutually adjacent plates in the plate pack" (col. 10, lines 65 to 67) so that "stoppers 14 are then able to roll out gravitationally through the outlet opening 9" (col. 11, lines 6 and 7).

From this it is apparent that the outlet opening 9 is vertically aligned with the inlet opening 8. This is further apparent with reference to the structure shown in FIG. 1 of Pethö, which illustrates an inlet opening 8 radially opposing the outlet opening 9 along a vertical cross-section of Pethö's apparatus. Accordingly, there is no disclosure of a sterilizing machine having an inlet at a first end and an outlet at a second end opposite to the first end relative to the longitudinal axis of the machine, as is specifically recited in applicant's dependent claim 31.

The plate pack is then driven through successive, indexed rotations (col. 11, lines 26 to 51) "until all channels 16 on a plate 13 have been emptied of stoppers" (col. 11, lines

52 and 53). During this process, as was done during the loading process, "the plate pack [is] prevented from moving axially while being freely rotatable" (col. 11, lines 58 to 60).

The plate pack is then "moved forwards through a distance corresponding to the distance between two mutually adjacent plates 13" (col. 12, lines 5 to 10), followed by the discharge of sterilized stoppers from the associated channels (col. 12, lines 19 to 25).

> This sequence of events is repeated until all channels or compartments on the plate concerned have been emptied of stoppers. The entire plate pack is then moved forwards through a further step in the axial direction, in the manner aforedescribed. This process can be repeated until the channels of all plates in the pack have been emptied of stoppers. The plate pack will now be located in a position in which it can be refilled with stoppers, in the aforedescribed manner, followed by washing and sterilizing of the stoppers. (col. 12, lines 28 to 37)

Thus, at the end of the sterilizing process, the plate pack of Pethö is returned to its initial position, for the performance of subsequent sterilization procedures.

From this, it is apparent that the apparatus disclosed by Pethö:

- does not disclose a helical path for directing stoppering parts through a sterilizing machine, as is specifically recited in applicant's claims;
- does not disclose a sterilizing machine having an inlet at a first end, and an outlet at a second end which is opposite to the first end relative to the longitudinal axis of the machine, as is specifically

recited in applicant's dependent claim 31; and

- does not disclose the use of a driving fluid to move stoppering parts through a sterilizing apparatus, as distinguished from rotational movements, as is specifically recited in applicant's dependent claim 47.

Pethö does not disclose a helical path for directing stoppering parts through a sterilizing machine, as is specifically recited in applicant's claims.

In the Office Action of June 28, 2005, the position is taken at lines 3 to 6 of Paragraph 2 (on page 2), and elsewhere, that Pethö "discloses an apparatus for sterilizing articles such that stoppers to be treated move in a helical path", referring to col. 4, lines 51 to 60, of Pethö. It is submitted that this is an incorrect reading of Pethö, which as previously indicated, repeatedly states that the plate pack is prevented from being moved axially while enabled for free rotation. No disclosure has been found which would suggest or even enable the combined axial and rotational movement which would be required to develop a helical transport path, in accordance with applicant's claims.

In connection with the position taken at lines 3 to 6 of Paragraph 2 of the Office Action (on page 2), it is further stated that Pethö's "stoppers travel in a circular and continuous curve around a central point of rotation and not receding or approaching the point of rotation". The intended purpose of this statement is not understood.

First, it is unclear precisely what is being defined by this statement. According to the previously supplied definition taken from the Merriam-Webster Dictionary, a "spiral" path can be defined by a "a point in a plane moving around a central point while continuously receding from or approaching it". Thus, a spiral path is not being defined by the statement made in the Office Action. The involute which is defined by Webster's Unabridged Dictionary, Second Edition (1975), and which is illustrated in the drawing which accompanies this definition, and in the drawings of Pethö, appears to continuously approach a central point. Thus, an evolvent path is not being defined by the statement made in the Office Action. As best can be determined, the statement made in the Office Action would appear to define a circular path, and portions of the path developed by Pethö's apparatus would appear to be appropriately defined as circular. Applicant, however, has not claimed a circular path, but rather has claimed a helical path.

Second, the statement made at lines 3 to 6 of Paragraph 2 of the Office Action (on page 2) is repeated at the top of page 7 of the Office Action, and from this it would appear that the subject movement is being characterized as "helical" in nature. However, according to the previously supplied definition taken from the Merriam-Webster Dictionary, a "helical" path is defined by "a curve traced on a cylinder or cone by the rotation of a point crossing its right sections at a constant oblique angle" (emphasis added). In Pethö, the stoppers are caused to move in a

complex pattern which includes radial movements through the plate pack during loading and unloading of the channels, rotational movements as the plate pack is rotated, and axial movements as the plate pack is moved to access the channels associated with different plates. None of these movements, however, occur "at a constant oblique angle", which is necessary for defining a "helical" path. These movements, therefore, cannot fairly be characterized as "helical", either alone or in combination.

The statement is then made, at lines 5 to 8 of page 7 of the Office Action, that "each stopper in the Petho reference moves along a curve and not getting closer or further from the point of rotation and thus can inherently be traced on a cylinder by the rotation of a point crossing its right sections at a constant oblique angle". While the stoppers of Pethö can be said to move along a curve during portions of their path through the apparatus, the curved path of the stoppers is not inherently traced on a cylinder at a constant oblique angle. As previously indicated, only rotation of the plate pack is permitted during filling of the channels of a given plate, and axial movement of the plate pack is prevented. Similarly, there is no disclosure of any rotation of the plate pack during axial movements of the plate pack. Thus, the transport path defined by such movements is comprised of movements at right angles only. Such movements do not, and cannot occur at a constant oblique angle, and accordingly, cannot be defined as a "helical" path.

Pethö does not disclose a sterilizing machine having an inlet at a first end, and an outlet at a second end which is opposite to the first end relative to the longitudinal axis of the machine, as is specifically recited in applicant's dependent claim 31.

In the Office Action of June 28, 2005, the position is taken at Paragraph 2, from line 5 through the bottom of page 2, and elsewhere, that in Pethö "the stoppers travel... between the inlet (figure 1: 8), which is at [a] first end and the outlet (figure 1: 9), which is at a second end such that both ends are opposed to each other", followed by a statement that "[Pethö's] sterilizing machine defines a longitudinal axis, which extends through the sterilizing machine such that the first end of the machine opposes the second end of the machine along the longitudinal axis (figure 3, longitudinal axis of rotation of shaft...)".

While this correctly recognizes the structures which are disclosed by Pethö, including an opposing first end 8 and second end 9 of the apparatus, and a defined longitudinal axis extending along the shaft 25 of Pethö, it is incorrect to conclude that the "first end of the machine opposes the second end of the machine along the longitudinal axis". The inlet 8 and the outlet 9 are not located at different positions along the shaft 25, or along a longitudinal axis which is defined by the shaft 25. Consequently, while it can fairly be said that the inlet 8 and the outlet 9 are radially opposed to each other, this is not the structure which is recited in applicant's dependent claim 31. It cannot be said that the inlet 8 and the outlet

9 are longitudinally opposed to each other, as is recited in applicant's dependent claim 31.

Pethö does not disclose the use of a driving fluid to move stoppering parts through a sterilizing apparatus, as distinguished from rotational movements, as is specifically recited in applicant's dependent claim 47.

In the Office Action of June 28, 2005, the position is taken at Paragraph 2, from the last line of page 3 to line 2 of page 4, and elsewhere, that in Pethö "the stoppering parts are set in motion along a helical path by a driving fluid (the injected hot water will inherently result in the motion of the stoppering parts)".

First, and for reasons previously stated, the path of the stoppers in Pethö cannot fairly be characterized as a helical path.

Second, the injection of hot water through the series of connections 10, 11, 12 cannot cause movement of the stoppers because, at this point in the process, the stoppers are secured in position by the partition walls 15 associated with the plates 13 of the plate pack, precluding any movement of the stoppers not caused by rotation of the plate pack.

Third, hot water is only injected into the chamber of Pethö's apparatus during the disclosed treatment phase (washing and sterilization). There is no injection of hot water into the chamber while the stoppers are being loaded into and unloaded from the plate pack. As a result, movements of the plate pack

are necessary for loading and unloading the stoppers. This is to be distinguished from the structure recited in applicant's dependent claim 47, which includes a stationary drum, and a slideway which is configured for movement of the stoppering parts with a driving fluid. To be noted is that a stationary drum would render the apparatus of Pethö completely inoperative, and that the channels (i.e., "slideways") of Pethö do not include any structures for causing movement of the stoppers they contain by a driving fluid.

Similarly, the Office Action of June 28, 2005, at lines 1 to 3 of page 3 of Paragraph 2, takes the position that in Pethö "parts are set in motion by friction against a rotating member (the rotational motion of the conveying system will inherently set the parts in motion due to friction against the rotating member)". As previously indicated, however, Pethö secures the stoppers in position using the partition walls 15 associated with the plates 13 of the plate pack, precluding any movement of stoppers not caused by rotation of the plate pack. Thus, the stoppers are not set in motion by friction against a rotating member, as is recited in applicant's dependent claim 33.

Accordingly, it is submitted that the Office Action of June 28, 2005, contains statements which are incorrect, which do not properly characterize the apparatus disclosed by Pethö, and which do not correctly characterize the subject matter which is recited in applicant's claims. Consequently, it is submitted that applicant's claims are not disclosed by Pethö, and are not

shown to be obvious in view of the teachings of Pethö, either alone or in combination with the teachings of the patent to Zucchini et al.

As a final matter, a "Power of Attorney" has been obtained which has been signed on behalf of the assignee of the present U.S. Patent Application. The Power of Attorney has been enclosed with this Reply, and entry of the enclosed Power of Attorney is respectfully requested.

In view of the foregoing, it is submitted that the present patent application is in condition for allowance and due reconsideration of this matter is respectfully requested. Corresponding action is earnestly solicited.

Respectfully submitted,

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I hereby certify that this correspondence is being facsimile transmitted to the United States Patent and Trademark Office (Fax No. 571-273-8300) on: December 21, 2005.

Date: 12/21/05

Gary M. Cohen, Esq.

state's evidence: (a) the evidence offered by the state in prosecuting criminal cases; (b) a person who gives testimony against accomplices in a crime of which he himself is guilty.

Syn.—proof, witness, testimony, affirmation, demonstration, certainty.

ev'i-dence, *v.t.*; evidenced (-denst), *pt.*, *pp.*; evidencing, *ppr.* 1. to indicate; to make clear.

2. to support by testimony; to attest.

ev'i-den-cer, *n.* a witness. [Obs.]

ev'i-dent, *a.* [ME. *evident*; OFr. *evident*; L. *evidens* (-*entis*), visible, clear; *e-*, out, and *videre*, to see.] plain; easy to see or perceive; apparent; as, the guilt of an offender cannot always be made *evident*.

Syn.—plain, visible, conspicuous, manifest, obvious, clear, palpable, apparent, discernible.

ev-i-den'tial (-shal), *a.* 1. of the nature of, or affording, evidence.

2. of, serving as, or based on evidence.

ev-i-den'tial-ly, *adv.* in an evidential manner.

ev-i-den'tia-ry (-shi-), *a.* same as *evidential*.

ev'i-dent-ly, *adv.* in an evident manner; clearly; obviously; plainly; manifestly.

ev'i-dent-ness, *n.* the state or quality of being evident.

ē-vig'i-lāte, *v.t.* to watch attentively. [Obs.]

ē-vig-i-lā'tion, *n.* a waking or watching. [Obs.]

ē'vil, *a.* [ME. *evel*; AS. *yfel*, evil.]

1. having bad moral qualities; sinful; bad; wicked; corrupt; perverse; as, *evil* thoughts; *evil* deeds.

2. causing pain or trouble; harmful; injurious.

3. threatening or bringing misfortune; unlucky; disastrous; unfortunate; as, an *evil* hour.

4. caused by or considered as being caused by immorality; as, an *evil* name; *evil* fame.

the evil eye; a supposed power, superstitiously ascribed in former times to certain persons, by means of which they could injure whomever they looked at.

the Evil One; the Devil.

Syn.—mischievous, pernicious, injurious, hurtful, destructive, noxious, baneful, baleful, wicked, bad, corrupt, perverse, vile, base, wrong, vicious, calamitous.

ē'vil, *n.* [ME. *evel*; AS. *yfel*, evil.]

1. anything that causes displeasure, injury, pain, suffering, etc.

2. moral depravity; wickedness; anything morally bad or wrong.

3. king's evil, a skin disease. [Obs.]

the social evil; prostitution.

ē'vil, *adv.* [ME. *ivile*; AS. *yfele*, in an evil manner.] not well; ill; in an evil manner; unfortunately; injuriously; unkindly.

ē'vil-dō'ẽr, *n.* one who does evil.

ē'vil-dō'ing, **ē'vil-dō'ing**, *n.* a doing of evil.

ē'vil eye (ī), the supposed power of harming others by merely looking at them, superstitiously attributed to some people.

ē'vil-eyed (-īd), *a.* possessing or believed to possess the evil eye; also, looking with envy, jealousy, or hostility.

ē'vil-fā'vored, *a.* having a bad countenance or appearance; ill-favored.

ē'vil-fā'vored-ness, *n.* the state of being evil-favored.

ē'vil-ly, *adv.* in an evil manner.

ē'vil-mind'ed, *a.* having an evil mind or disposition; specifically, (a) malicious; wicked; (b) putting an evil interpretation on innocent things; salacious; prurient.

ē'vil-mind'ed-ness, *n.* the state or quality of being evil-minded.

ē'vil-ness, *n.* the state or quality of being evil.

ē-vince', *v.t.*; evinced (-vinst'), *pt.*, *pp.*; evincing, *ppr.* [L. *evincere*, to conquer, overcome; *e-*, from, out, and *vincere*, to conquer.]

1. to show in a clear manner; to indicate; to manifest; to make evident; especially, to show that one has (a quality, feeling, etc.); as, to *evince* a desire; to *evince* stupidity.

2. to conquer; to overcome. [Obs.]

ē-vince'ment, *n.* the act of evincing. [Rare.]

ē-vin'ci-ble, *a.* capable of being evinced; demonstrable.

ē-vin'ci-bly, *adv.* in an evincible manner.

ē-vin'cive, *a.* tending or having the power to evince.

ē'vi-rāte, *v.t.* to emasculate. [Obs.]

ev-i-rā'tion, *n.* castration. [Obs.]

ē-vis'cer-āte, *v.t.*; eviscerated, *pt.*, *pp.*; eviscerating, *ppr.* [L. *evisceratus*, pp. of *eviscerare*, to deprive of the entrails.]

1. to disembowel; to take out the entrails of.

2. to deprive of an essential part; to take away the force, significance, etc. of.

ē-vis-cer-ā'tion, *n.* the act of eviscerating or the state of being eviscerated.

ev'i-ta-ble, *a.* [L. *evitabilis*, avoidable, from *evitare*, to shun, avoid.] capable of being avoided; avoidable.

ev'i-tāte, *v.t.* to avoid. [Obs.]

ev-i-tā'tion, *n.* an avoiding. [Obs.]

ē-vite', *v.t.* to shun; to avoid. [Archaic.]

ev-i-tẽr'nal, *a.* enduring forever; eternal. [Obs.]

ev-i-tẽr'nal-ly, *adv.* eternally. [Obs.]

ev-i-tẽr'ni-ty, *n.* eternity. [Obs.]

ē-vit'tāte, *a.* [L. *e-* priv., and *vitta*, a band, fillet.] in botany, having no vittae, as the fruit of certain plants.

ev'ō-ca-ble, *a.* that can be called forth.

ev'ō-cāte, *v.t.*; evocated, *pt.*, *pp.*; evocating, *ppr.* to evoke; to call forth. [Rare.]

ev-ō-cā'tion, *n.* [L. *evocatio* (-*onis*), a calling out or forth, from *evocatus*, pp. of *evocare*, to call out or forth.]

1. a calling forth; an evoking; a summons.

2. in civil law, the removal of a case from a lower to a higher court.

ē-vo'ca-tive (or **ē-vok'a-**), *a.* evoking or tending to evoke.

ev'ō-cā-tor, *n.* [L.] one who evokes.

ē-voke', *v.t.*; evoked (-vōkt'), *pt.*, *pp.*; evoking, *ppr.* [L. *evocare*, to call forth, summon; *e-*, out, from, and *vocare*, to call.]

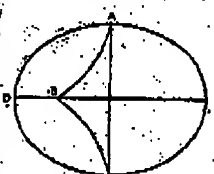
1. to call forth; to summon; to bring out; to elicit, as a response, etc.

2. to call from one tribunal to another. [Rare.]

ev-ō-lat'ic, **ev-ō-lat'ic-al**, *a.* apt to fly away. [Obs.]

ev-ō-lā'tion, *n.* the act of flying away. [Obs.]

ev'ō-lūte, *n.* [L. *evolutus*, pp. of *evolvere*, to unroll, unfold; *e-*, out, from, and *volvere*, to roll.] in geometry, a curve that is either the locus of the centers of curvature of another curve (called the *involute*), or the envelope of the perpendiculars, or normals, of the involute.



EVOLUTE
ABC, evolute of ADC

ev'ō-lū-til'i-ty, *n.* in biology, the capability of an organism to exhibit change in structure, size, etc. as a result of nutrition.

ev-ō-lū'tion, *n.* [L. *evolutio* (-*onis*), an unrolling or opening, from *evolutus*, pp. of *evolvere*, to unroll; *e-*, out, and *volvere*, to roll.]

1. the act of unfolding or unrolling; a process of development, formation, or growth.

2. a thing or series of things unrolled, unfolded, or evolved; as, the *evolution* of ages.

3. in mathematics, (a) the unfolding or opening of a curve, making it describe an involute; (b) the extraction of the root from a given power: the reverse of *involution*.

4. a change of position, especially in accordance with some definite plan; specifically, (a) in military usage, the doubling of ranks or files, wheeling, countermarching, or other motion by which the disposition of troops is changed; (b) in naval usage, the change of form and disposition of a fleet or the movements of a single vessel during maneuvers.

5. (a) a movement that is part of a series or pattern; (b) a pattern produced, or seemingly produced, by such a series of movements; as, the *evolutions* of a fancy skater.

6. a setting free; giving off; emission or disengaging.

7. in biology, (a) the development of a species, organism, or organ from its original or rudimentary state to its present or completed state; phylogeny or ontogeny; (b) the obsolete theory that the germ cell contains the fully developed individual in miniature form; the theory of preformation; (c) the theory, now generally accepted, that all species of plants and animals developed from earlier forms by hereditary transmission of slight variations in successive generations.

ev-ō-lū'tion-al, *a.* same as *evolutionary*.

ev-ō-lū'tion-a-ry, *a.* 1. pertaining to evolution; developmental.

2. in accordance with the theory of evolution.

3. of or by evolutions.

ev-ō-lū'tion-ism, *n.* the theory of evolution.

ev-ō-lū'tion-ist, *n.* 1. a person who believes in the theory of evolution.

2. a person who believes in the possibility of political and social progress by gradual, peaceful steps.

ev-ō-lū'tion-ist, *a.* 1. of the theory of evolution.

2. of evolutionists.

ē-volve', *v.t.*; evolved, *pt.*, *pp.*; evolving, *ppr.* [L. *evolvere*, to roll out or forth; *e-*, out, and *volvere*, to roll.]

1. to unfold; to open out; to work out; to develop gradually.

2. to set free or give off (gas, heat, etc.); to emit or disengage.

3. to produce or change by evolution.

ē-volve', *v.i.* to develop gradually; to reach a highly developed state by a process of growth and change.

2. to unfold; to become disclosed.

ē-volve'ment, *n.* the act of evolving or the state of being evolved.

ē-volv'ent, *n.* [L. *evolvens* (-*entis*), ppr. of *evolvere*, to evolve.] in mathematics, an involute.

ē-vom'it, *v.t.* to vomit. [Obs.]

ev-ō-mi'tion (-mish'un), *n.* the act of vomiting. [Obs.]

ev-on'y-mus, *n.* same as *euonymus*.

ē-vul'gāte, *v.t.* to publish. [Obs.]

ē-vul-gā'tion, *n.* a divulging. [Obs.]

ē-vul'sion, *n.* [L. *evulsio* (-*onis*), from *evulsus*, pp. of *evellere*, to pull or pluck out.] the act of plucking or pulling out by force.

ew (ū), *n.* yew. [Obs.]

ewe (ū), *n.* [ME. *ewe*; AS. *eowu*, a flock of sheep.] a female sheep.

ewe'-neck (ū'nek), *n.* a thin neck, not arched, as that of some horses.

ewe'-necked (ū'nekt), *a.* having a ewe-neck.

ew'ẽr, *n.* [ME. *ewer*; OFr. *ewere*, a water carrier, a water pitcher, from LL. *aquaria*, a water pitcher, from L. *aquarius*, for water, from *aqua*, water.] a kind of pitcher with a wide spout, especially one used with a basin on washstands.

ew'ẽr-y, *n.* [ME. *ewery*, from OFr. *ewere*, a water pitcher.] formerly, a room where table linen and towels were kept and water placed in ewers for use in the household.

ewt, *n.* a newt. [Obs.]

ex, *prep.* [L.] in business and finance, (a) without; exclusive of; as, *ex* dividend, *ex* interest; (b) out of; free of; *ex warehouse* means "free of charges until removed from the warehouse."

ex, *n.*; *pl.* **ex'es**, 1. the letter X, x.

2. something shaped like an X.

ex- (or **egz**), [from L. *ex*, Gr. *ex*, out, from.]

1. a prefix meaning: (a) *forth, from, out*, as in expel, exert, excoriate; (b) *beyond*, as in excess; (c) *away from, out of*, as in expropriate, expatriate; (d) *thoroughly*, as in exterminate; (e) *upward*, as in exalt; (f) *without, not having*, as in exanimate. It appears as *ef-* before *f*, as in *efface*; *e-* before *b, d, g, h, l, m, n, r*, and *v*, as in educe, egress, elect, emit, etc.; often *ec-*, before *c* or *s*, as in eccentric, ecstasy; and in many words of French origin, *es-*, as in escape.

2. [orig. from L. phrases like *ex consule*, *ex magistro*,] a prefix meaning *former, previous, previously*, used to form hyphenated compounds with nouns denoting position, rank, occupation, status, etc., as in *ex*-president, *ex*-convict, etc.

ex-, **exo-**.

ex-ac'ẽr-bāte (egz-), *v.t.*; exacerbated, *pt.*, *pp.*; exacerbating, *ppr.* [L. *exacerbatus*, pp. of *exacerbare*, to exasperate, make angry; *ex-*, intens., and *acerbus*, bitter, harsh, sour.]

1. to irritate; to exasperate; to annoy; to embitter.

2. to make more intense or sharp; to aggravate (disease, pain, annoyance, etc.).

ex-ac-ẽr-bā'tion, *n.* [LL. *exacerbatio* (-*onis*), from L. *exacerbatus*, pp. of *exacerbare*, to irritate; *ex-* intens., and *acerbus*, bitter.]

1. the act of exacerbating or the state of being exacerbated.

2. intensification or aggravation, as of a disease, pain, etc.

ex-ac-ẽr-bes'cence (egz-), *n.* exacerbation. [Obs.]

ex-ac-ẽr-vā'tion, *n.* the act of heaping up. [Obs.]

ex-ac'i-nāte (egz-), *v.t.* [L. *ex-* priv., and *acinus*, a berry, the seed of a berry.] to remove the kernel from. [Rare.]

ex-ac-i-nā'tion, *n.* the act of taking out the kernel. [Rare.]

ex-act' (egz-), *a.* [L. *exactus*, precise, accurate, from pp. of *exigere*, to drive out, to measure, determine.]

1. correct; accurate; precise; correctly adjusted; not differing in the least from a stan-

fāte, fär, fȧst, fạll, fīnăl, cãre, at; mēte, prẹy, hẽr, met; pīne, marīne, bird, pin; nōte, mōve, fọr, atŏm, not; moon, book;

[illegible]o·late·ness, n. the quality of being inviolate.

[illegible]ous, a. [L. invius; in- priv., and via, way.] impassable; untrodden. [Obs.]

[illegible]ous·ness, n. state of being invious. [Obs.]

[illegible]rile, a. [L. in- priv., and virilis, belonging to a man, from vir, a man.] lacking in virility.

[illegible]ril'i·ty, n. lack of virility.

[illegible]cāte, v.t. to make sticky.

[illegible]cer·āte, v.t. to root or implant deeply.

[illegible]bil'i·ty, n. the quality or state of being invisible.

[illegible]i·ble, a. [L. invisibilis; in- priv., and visibilis, visible, from videre, to see.]
[illegible] not visible; that cannot be seen.
[illegible] out of sight; not apparent.
[illegible] too small or too faint to be seen; imperceptible; indistinct.
[illegible] kept hidden; as, invisible assets.
[illegible] green, a shade of green so dark as [illegible] to be distinguishable from black.
[illegible] ink; see invisible ink, under ink.
[illegible]i·ble, n. 1. [I-] an invisible thing or [illegible]
[illegible] a Rosicrucian. [Obs.]
[illegible] a heretic of the sixteenth century who denied the visibility of the church.
[illegible] Invisible; (a) God; (b) the unseen world.
[illegible]i·ble·ness, n. invisibility.
[illegible]i·bly, adv. in an invisible manner; so as [illegible] invisible.
[illegible]sion, n. lack of vision or the power of [illegible] [Obs.]
[illegible]tā'tion, n. [L. invitatio (-onis), from invitare, to invite, ask.]
[illegible] act of inviting; solicitation to do [illegible]thing or to come somewhere; the requesting of a person's company, as to visit or [illegible]
[illegible] written, printed, or spoken message re[illegible] one's presence.
[illegible] temptation; enticement; attraction.
[illegible]tȧ·tō·ry, a. pertaining to or containing an invitation.
[illegible]tȧ·tō·ry, n.; pl. in·vi'tȧ·tō·ries, [LL. invitatorius, inviting, from L. invitator, one who [illegible] from invitare, to invite.] a form of in[illegible] used in worship to call to prayer, or [illegible]
[illegible] v.t.; invited, pt., pp.; inviting, ppr. [illegible] from L. invitare, to ask, treat as a [illegible] entertain.]
[illegible] ask (a person) courteously to do some[illegible] to come to some place; to request the [illegible]pany of; as, to invite friends to a wedding.
[illegible] make a request for; as, the speaker in[illegible] questions.
[illegible] to allure; to attract; to tempt.
[illegible] give or offer favorable chance or open[illegible] to tend to bring on; as, such talk in[illegible] scandal.
[illegible] v.i. to extend invitation.
[illegible] n. an invitation. [Slang.]
[illegible]ment, n. invitation. [Obs.]
[illegible] n. one who invites.
[illegible]āte (-vish'i-), a. not vitiated; pure; un[illegible] [Rare.]
[illegible] a. alluring; enticing; attractive; as, [illegible] spot.
[illegible]ing·ly, adv. in an inviting manner.
[illegible]ing·ness, n. the quality of being invit[illegible]
[illegible]ri·fī'ȧ·ble, a. that cannot be vitrified.
[illegible]cāte, v.t. and v.i.; invocated, pt., pp.; in[illegible] ppr. [from L. invocatus, pp. of invo[illegible] in, on, and vocare, to call.] to speak [illegible] invocation. [Rare.]
[illegible]tion, n. 1. the act of calling on God, [illegible] the Muses, etc. for blessing, help, in[illegible] protection, etc.
[illegible] (a) a formal prayer used in invoking, as [illegible] beginning of a church service; (b) a [illegible] plea for aid from a Muse, god, etc., at [illegible]ginning of an epic or similar poem.
[illegible] a conjuring of evil spirits; (b) an in[illegible] used in conjuring.
[illegible] law, a formal request from the bench [illegible] papers or evidence pertaining to a case [illegible] than that under trial.
[illegible]ȧ·tō·ry, a. of, having the nature of, or [illegible] invocation.
[illegible] n. [earlier invoyes, pl.; Fr. envois, pl. [illegible] a sending, conveyance, from envoyer, [illegible]
[illegible] an itemized list of goods shipped to a [illegible] stating quantities, prices, shipping [illegible] etc.
[illegible] a shipment of invoiced goods.
[illegible] v.t.; invoiced (-voist), pt., pp.; invoicing, ppr. to make a written account or invoice of, as goods or property with their prices; to list in an invoice.

in·vōke', v.t.; invoked (-vōkt'), pt., pp.; invoking, ppr. [L. invocare, to call upon; in, in, on, and vocare, to call.]
1. to call on (God, a saint, the Muses, etc.) for blessing, help, inspiration, protection, etc.
2. to summon (evil spirits) by incantation; to conjure.
3. to ask solemnly for; to beg for; to implore; entreat.

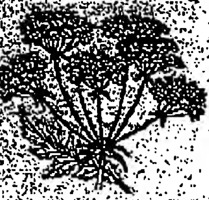
in·vol'ū·cel, n. [Mod. L. involucellum, dim. from L. involucrum.] a secondary involucre; a ring of small leaves, or bracts, at the base of each flower of a cluster.

in·vō·lū'cel·lāte, a. having involucels.

in·vō·lū'crȧl, a. of or like an involucre.

in·vō·lū'crāte, in·vō·lū'crā·ted, a. having an involucre.

in·vō·lū'cre (-kẽr), n. [L. involucrum, a wrapper, case, envelope, from involvere, to roll up, wrap up; in, in, and volvere, to roll.]
1. in anatomy, a membranous covering or envelope.
2. in botany, a ring of small leaves, or bracts, at the base of a flower, flower cluster, or fruit: involucres, often resembling a calyx, are found in all composite plants.


INVOLUCRE OF HEMLOCK PLANT

in·vō·lū'crēd (-kẽrd), a. having an involucre; involucrate.

in·vō·lū'crum, n.; pl. in·vō·lū'crȧ, an involucre.

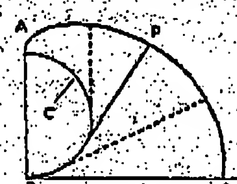
in·vol'un·tȧ·ri·ly, adv. not by choice; not spontaneously; in an involuntary manner.

in·vol'un·tȧ·ri·ness, n. the state or quality of being involuntary.

in·vol'un·tȧ·ry, a. [LL. involuntarius; L. in- priv., and voluntarius, willing, from voluntas, will, choice, from the root of velle, to will.] not voluntary; specifically, (a) not done of one's own free will; not done by choice; (b) unintentional; accidental; (c) not consciously controlled; automatic; as, digestion is involuntary.

in'vō·lūte, in'vō·lū·ted, a. [L. involutus, pp. of involvere, to roll up, wrap up; in, in, and volvere, to roll.]
1. intricate; involved.
2. rolled up or curled in a spiral; having the whorls wound closely around the axis; as, involute shells.
3. in botany, rolled inward at the edges; as, involute leaves.

in'vō·lūte, n. 1. anything intricate or involved. [Rare.]
2. in geometry, the curve traced by the end of a taut string when it is wound upon or unwound from a fixed curve on the same plane with it: correlative to evolute.



INVOLUTE
AB, involute made by point P of string unrolled from curve C

in·vō·lū'tion, n. [LL. involutio (-onis), a rolling up, from L. involutus, pp. of involvere, to roll up.]
1. an involving or being involved; entanglement.
2. anything that is involved; complication; intricacy.
3. in anatomy, a part formed by rolling or curling inward.
4. in biology, a retrograde or degenerative change.
5. in grammar, an involved construction, especially one created by a clause separating a subject from the predicate.
6. in mathematics, the raising of a quantity to any given power.
7. in medicine, (a) the return of an organ to its normal size after distention, as, the involution of the womb after childbirth; (b) a decline in the normal functions of the body or an organ, especially, the changes occurring at the menopause.

in·vō·lū'tion·ȧl, a. of or resulting from involution.

in·vō·lū'tion·ȧ·ry, a. of or characterized by involution.

in·volve', v.t.; involved, pt., pp.; involving, ppr. [L. involvere, to roll up, wrap up; in, in, and volvere, to roll.]
1. to roll up; to wrap; enfold; envelop; as, fog involved the shoreline.
2. to wind spirally; to coil up; as, the serpent involved its body.
3. to make intricate or tangled; to complicate.
4. to entangle in trouble, difficulty, danger, etc.; to implicate.
5. to roll up within itself; to include; as, the procession involved thousands as it moved toward the Bastille.
6. to bring into connection; to require; as, expansion in business involves expenditure.
7. to occupy the attention of; as, he was involved in working out a solution to the problem.
8. in mathematics, to raise (a quantity) to a given power.
Syn.—embarrass, entangle, include, implicate, imply.

in·volved', a. not easily understood; intricate; complicated.

in·volv'ed·ness, n. the state or quality of being involved.

in·volve'ment, n. 1. an involving or being involved.
2. anything that is involved; a complicated state of affairs.

in·vul'gȧr, v.t. to make vulgar. [Obs.]

in·vul'gȧr, a. not vulgar. [Obs.]

in·vul'nẽr·ȧ·bil'i·ty, n. the quality or state of being invulnerable, or secure from injury.

in·vul'nẽr·ȧ·ble, a. [L. invulnerabilis; in- priv., and vulnerare, to wound, from vulnus (-eris), a wound.]
1. that cannot be wounded or injured.
2. unassailable, as an argument; able to reply to all arguments; proof against attack.

in·vul'nẽr·ȧ·ble·ness, n. invulnerability.

in·vul'nẽr·ȧ·bly, adv. in an invulnerable manner; so as to be invulnerable.

in·vul'nẽr·āte, a. uninjured. [Obs.]

in·wall', v.t.; inwalled, pt., pp.; inwalling, ppr. to enclose or fortify with or as with a wall.

in'wall, n. an inner wall, as the lining wall of a blast furnace.

in'wȧrd, a. [ME. inward; AS. inneweard, inneweard; in, in, and -weard, -ward.]
1. situated within; being on the inside; internal; as, the inward organs of the body.
2. of or belonging to the inner nature of a person; mental or spiritual.
3. directed toward the inside; ingoing; as, the inward pull of a centrifuge.
4. of the inside or inner part, as of the body.
5. inland; as, inward Asia.
6. inherent; intrinsic.
7. domestic. [Archaic.]
8. (a) intimate; familiar; (b) private; secret. [Obs.]

in'wȧrd, n. 1. the inside; inward part.
2. [pl.] the entrails.
3. [pl.] imported articles, or dues on these. [Brit.]
4. an intimate friend. [Obs.]

in'wȧrd, in'wȧrds, adv. 1. toward the inside, interior, or center.
2. into the mind, thoughts, or soul.
3. internally. [Obs.]

in'wȧrd·ly, adv. 1. in the inner part; on the inside; internally.
2. in the mind or spirit; privately; secretly.
3. toward the center; inward.
4. familiarly; intimately. [Archaic.]

in'wȧrd·ness, n. 1. the inner nature, essence, or meaning.
2. the quality or state of being inward; spirituality.
3. depth of thought or feeling; sincerity.

in'wȧrds, adv. see inward.

in·weave', v.t.; inwove, pt.; inwoven, pp.; inweaving, ppr. to weave in; to interweave.

in·wheel' (-hwēl'), v.t. to enwheel. [Obs.]

in·wind', v.t. to wind in; to wind about; to entwine.